PATENT

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

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Filing Date:	July 29, 2003
Applicant:	Mau-Song Chou
Group Art Unit:	1743
Examiner:	Yelena G. Gakh
Title:	REMOTE DETECTION AND ANALYSIS OF CHEMICAL AND BIOLOGICAL AEROSOLS
Attorney Docket:	NGC-00089 (000342-804)

APPELLANT'S SUPPLEMENTAL BRIEF IN RESPONSE TO THE NOTIFICATION OF NON-COMPLIANT APPEAL BRIEF

This is Appellant's Supplemental Appeal Brief filed in accordance with 37 CFR §41.37 in response to the Notification of Non-Compliant Appeal Brief mailed May 18, 2007.

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I. Real Party in Interest

The real party in interest for this appeal is the Northrop Grumman Corporation of Los Angeles, California, the Assignee of the application.

II. Related Appeals and Interferences

There are no related appeals or interferences.

III. Status of the Claims

Claims 1-14 and 21-26 are pending in this application. Of these claims, claims 1-14 and 21-26 have been rejected, no claims have been allowed, claims 4 and 13 have been withdrawn from consideration and claims 15-20 have been cancelled. The Examiner has not considered claims 4 and 13 as being directed to non-elected species. Appellant submits that independent claims 1 and 8 are currently generic. Claim 26 was mistakenly numbered as a second claim 25, and has been objected to by the Examiner. Appellant believes that this mistake can be easily corrected by Examiner's amendment when this application issues.

Claims 1-3, 5-12, 14 and 21-26 stand rejected under 35 USC §112, second paragraph, as being indefinite; Claims 1-3, 5-7 and 21-23 stand rejected under 35 USC §102(b) as being anticipated by U.S. Patent No. 4,496,939 issued to Bernstein et al (hereinafter Bernstein); Claims 1-3, 5-7 and 21-23 stand rejected under 35 USC §102(b) as being anticipated by U.S. Patent No. 5,373,160 issued to Taylor (hereinafter Taylor); Claims 1-3, 5-7 and 21-23 stand rejected under 35 USC §102(b) as being anticipated by Childers et al. (hereinafter Childers); Claims 1-3, 5 and 21-23 stand rejected under 35 USC §102(e) as being anticipated by U.S. Patent Publication 2004/0211900 to Johnson (hereinafter

Johnson); Claims 1-3, 5-7 and 21-23 stand rejected under 35 USC §103(a) as being unpatentable over Theriault et al. (Pure Apple Opt., 1998) (hereinafter Theriault); Claims 8, 9, 11, 12, 14 and 24-26 stand rejected under 35 USC §103(a) as being upatentable over Samuels et al. (Proceed., 2001) (hereinafter Samuels) in view of Bernstein; Claims 8, 9, 11, 12, 14 and 24-26 stand rejected under 35 USC §103 (a) as being unpatentable over Bernstein in view of Samuels; and Claim 10 stands rejected under 35 USC §103 (a) as being unpatentable over Samuels and Bernstein in view of U.S. Patent No. 4,710,887 issued to Ho (hereinafter Ho) or U.S. Patent No. 4,568,190 issued to Carlon et al. (hereinafter Carlon).

IV. Status of Amendments

All amendments have been entered.

V. Summary of Claimed Subject Matter

Independent claims 1 and 21 claim a detection and analysis system 10 that detects and analyzes chemical and/or biological aerosols within a target cloud 12 in the air, as shown in Figure 1. The system 10 includes a radiation source 14, an emissions collection telescope 16 and a spectrometer 18. The radiation source 14 emits a radiation beam 20 that is focused by a lens 22 and then expanded and collimated by a beam-expanding telescope 24 to a desirable size. A telescope 24 directs the radiation beam 20 towards the cloud 12. Passive emissions 26 from the cloud 12 are collected by the telescope 16 and directed to the spectrometer 18 (paragraph 21).

The source 14 can be selected so that the wavelength of the radiation beam 20 is in resonance with a particular target molecule or molecules of the aerosol within the cloud 12

being detected. Alternately, the source 14 can be selected so that the wavelength of the radiation beam 20 is in resonance with the adsorption lines of water vapor molecules or oxygen molecules commonly present in the air. The resonance causes the target molecules, water vapor molecules or oxygen molecules to rotate or vibrate, which causes their energy to increase. The radiation energy absorbed by the water vapor molecules, the oxygen molecules or the target molecules in the cloud 12 is thermalized as a result of collision energy transfer causing inter-molecular relaxation. The collisional energy redistribution heats the cloud 12. An increase in the temperature of the cloud 12 will increase the emission intensity of the molecules in the cloud against the cooler background, resulting in improved detection of the aerosol molecules in the cloud 12 (paragraph 24).

Independent claims 8 and 24 claim a system for detecting and analyzing chemical or biological aerosols, such as the system 40 shown in figure 2. The system 40 includes a chamber 42 in which the aerosol to be detected is confined. If the sample originally starts out as a fine powder, fans 44 and 46 can agitate or blow the fine powder into an aerosol that circulates within the chamber 42. A laser 48 generates a laser beam 50 that is directed through a transparent window 54 at one end of the chamber 42, where the laser beam 50 then propagates through a transparent window 56 at an opposite end of the chamber 42. The spectrometer 58 receives passive emissions 60 from within the chamber 42 through the window 54 as a result of the laser beam heating the material within the chamber 42 relative to an ambient background temperature. The same resonance action discussed above is used to provide the heating of the material in the chamber 42.

Concerning dependent claims 2 and 11, paragraph [0021] of the Specification states that the spectroanalysis device can be a spectrometer 18. Concerning dependent claims 3, 12, 22 and 25, paragraph [0022] of the Specification states that the spectrometer 18 can be a Fourier transform infrared spectrometer, grading tuned or dispersed spectrometers, acoustic-optics spectrometers, circular variable filters spectrometers, linear variable spectrometers, MEMS spectrometers and an imaging spectrometer. Concerning dependent claims 5, 14, 23 and 26, paragraph [0022] of the Specification states that the radiation source 12 can be a continuous wave laser, an HF laser, a DF laser, a solid-state laser and fiber lasers. Concerning dependent claim 6, paragraph [0021] of the Specification states that the radiation beam 20 can be expanded by a beam expanding telescope 24. Concerning dependent claim 7, paragraph [0021] of the Specification states that the system 10 can include a collection telescope 16. Concerning dependent claim 9, paragraph [0028] of the Specification states that the windows 54 and 56 in the chamber 42 can be any transparent window, such as polished salt windows, zinc selenide windows and other suitable windows have anti-reflective coatings. Concerning dependent claim 10, paragraph [0027] of the Specification states that the test chamber 42 can include fans 44 and 46 for blowing a fine powder into an aerosol.

VI. Grounds of Rejection to be Reviewed on Appeal

Whether claims 1-3, 5 -12, 14 and 21-26 should be rejected under 35 USC §112, second paragraph;

Whether claims 1-3, 5-7 and 21-23 should be rejected under 35 USC §102(b) as being anticipated by Bernstein;

Whether claims 1-3, 5-7 and 21-23 should be rejected under 35 USC §102 (b) as being anticipated by Taylor;

Whether claims 1-3, 5-7 and 21-23 should be rejected under 35 USC 102(b) as being anticipated by Childers;

Whether claims 1-3, 5 and 21-23 should be rejected under 35 USC §102(e) as being anticipated by Johnson;

Whether claims 1-3, 5-7 and 21-23 should be rejected under 35 USC §103(a) as being unpatentable over Theriault;

Whether claims 8, 9, 11, 12, 14 and 24-26 should be rejected under 35 USC §103(a) as being unpatentable over Samuels in view of Bernstein;

Whether claims 8, 9, 11, 12, 14 and 24-26 should be rejected under 35 USC §103(a) as being unpatentable over Bernstein in view of Samuels; and

Whether claim 10 should be rejected under 35 USC §103(a) as being unpatentable over Samuels and Bernstein in view of Ho or Carlon.

VII. Argument

A. Claims 1-3, 5-12, 14 and 21-26 are not indefinite under 35 USC §112, second paragraph

MPEP 2173.02 states that, "[i]n reviewing a claim for compliance with 35 USC §112, second paragraph, the Examiner must consider the claim as a whole to determine whether the claim apprises one of ordinary skill in the art of its scope and, therefore, serves the notice function . . . " MPEP 2173.02 further states that, "[i]f the language used by Applicant satisfies the statutory requirements of 35 USC §112, second paragraph, but the

Examiner merely wants the Applicant to improve the clarity or precision of the language used, the claim must not be rejected under 35 USC §112, second paragraph, rather, the Examiner should suggest improved language to the Applicant." MPEP 2173.04 states that the "[b]reath of a claim is not to be equated with indefiniteness." MPEP 2173.04 also states that, "[i]f the scope of the subject matter embraced by the claims is clear, and if Applicant's have not otherwise indicated that they intend the invention to be of a scope different from that defined in the claims, then the claims comply with 35 USC §112, second paragraph." MPEP 2173.05(b) states that, "[t]he fact that claim language, including terms of degree, may not be precise, does not automatically render the claim indefinite under 35 USC §112, second paragraph," and "[a]acceptability of the claim language depends on whether one of ordinary skill in the art would understand what is claimed, in light of the specification."

It is the Examiner's position that claims 1 and 24 are indefinite because it is not apparent as to what is a chemical and/or biological aerosol in a sample cloud in the air. Presumably the Examiner means independent claim 21 and not claim 24. The Examiner has cited the article "Dispersal and Fate of Chemical Warfare Agents" to support her position that the aerosol is the cloud. Appellant submits that it is well known in the art to remotely detect the constituents or chemical species of various materials in the air as evidenced by the several references of record. Appellant further submits that one of ordinary skill in the art would readily understand that the sample cloud in independent claim 1 and 21 refers to an area in the sky that contains an air-borne material that may contain the chemical and/or biological aerosol of interest. Various uses for such remote detection include the analysis of materials being emitted from a factory smokestack. As the aerosol is dispersed in the air, the area in the sky including the aerosol would change in size and

density. However, because the aerosol is in the air, it is mixed in with water vapor, oxygen molecules and other materials. Therefore, Appellant submits that referring to a chemical and/or biological aerosol in a sample cloud in the air is not indefinite.

It is also the Examiner's position that claims 1, 8, 21 and 24 are indefinite because these claims do not specifically identify the radiation source. Obviously, Appellant intentionally did not identify the specific radiation source in the independent claims because many different radiation sources of various types would be applicable for raising the temperature of a sample cloud or material in the air in combination with the teachings of the invention. The selection of the source would depend on the wavelength needed to resonate the material to heat the sample. Paragraph 22 of the specification states that the radiation source 12 can be any laser, millimeter-wave or microwave source suitable for the purposes of the invention. Applicable lasers include HF lasers, DF lasers, solid-state lasers and fiber lasers. Appellant submits that one of ordinary skill in the art would understand that many different types of radiation sources could be used based on Appellant's specification. Therefore, Appellant submits that independent claims 1, 8, 21 and 24 are not indefinite for this reason.

It is also the Examiner's position that claims 1, 8, 21 and 24 are indefinite because the specific type of emissions from the sample cloud is not identified. Obviously, Appellant intended not to specifically define which emissions are being analyzed in the independent claims because it would depend on the particular aerosol that was being detected as to what frequency band of interest the spectrometer was looking for. The emissions band of the several aerosols that could be detected, many of which are talked about in the specification, would cover a wide frequency band, and the particular spectrometer would

have to be selected for which frequency was being detected. Therefore, Appellant submits that independent claims 1, 8, 21 and 24 are not indefinite for this reason either.

It also appears to be the Examiner's position that independent claims 1 and 21 are indefinite because specific structural elements are not defined for local or remote detection. Appellant finds this discussion by the Examiner indefinite as to what the difference is between local and remote detection, and is at a loss as to how the independent claims 1 and 21 can be indefinite for this reason.

It is also the Examiner's position that independent claims 8 and 24 are indefinite because the exact position of the radiation source, the spectrum analysis device and the chamber is not given. Appellant submits that there are many configurations and positions that the radiation source, the spectrum analysis device and the chamber can have within the scope of the invention. Appellant submits that these three elements of independent claims 8 and 24 are described in enough detail for one of ordinary skill in the art to understand because these claims specifically state that the radiation source directs a radiation beam through a window in the chamber to heat the aerosol and a spectrum analysis device receives emissions form the aerosol through the first window. Figure 2 clearly shows one configuration as to how this is possible. Therefore, Appellant submits that independent claims 8 and 24 are not indefinite for this reason.

It is also the Examiner's position that dependent claim 10 is indefinite because there is no relation between the powder and the aerosol. The inventor has signed a declaration stating that he has reviewed and understands the contents of the application. Part of the inventor's understanding is that fans can be provided in the sample chamber of the system 40 to agitate or blow a fine powder into an aerosol as discussed in paragraph 27. Several

examples of suitable powders are given in that paragraph. Appellant further submits that one of ordinary skill in the art would understand how the powder is related to the aerosol from this discussion. Therefore, Appellant submits that independent claim 10 is not indefinite for this reason.

B. Independent claims 1 and 21 are not anticipated by Bernstein, Taylor, Childers or Johnson

1. Anticipation

MPEP 2131 states that, "[a] claim is anticipated only if each and every element as set forth in the claim is found, either expressly or inherently described, in a single prior art reference."

2. Independent claims 1 and 21

Independent claims 1 and 21 include a radiation source that directs a radiation beam towards a sample cloud including a chemical and/or biological aerosol, where the radiation beam heats the cloud <u>itself</u> relative to the clouds background. A spectrum analysis device receives passive emissions from the cloud, and generates an emissions spectrum of the aerosol. Independent claim 21 also specifically states that the frequency of the radiation beam is selected to be in resonance with target molecules, water vapor molecules or oxygen molecules in the cloud to cause the molecules to vibrate and increase the temperature of the cloud.

3. Bernstein

Appellant has filed a terminal disclaimer disclaiming the term of the patent that may issue from this application beyond the term of commonly owned US Patent No. 6,531,701. The '701 patent claims a detection system that employs the same process of using a

radiation beam to heat a sample cloud relative to its background to increase the emissions from the cloud so that they can be detected. Bernstein was cited against the application from which the '701 patent issued. The following discussion was used to differentiate the claimed invention in the '701 patent from Bernstein.

Bernstein discloses a system for the remote detection and identification of species by laser initiated non-resonant infrared spectroscopy. A laser source emits a laser beam at a first wavelength that is directed to a remote gas cloud. The laser beam excites a vibrational-rotational state in the molecules of the target chemical species in the cloud. The population of initially excited states at the resonant laser wavelength quickly relax both vibrationally and rotationally to a broad distribution that can re-emit non-resonantly wherever the molecule has an allowed adsorption band to provide emissions at other wavelengths. (Column 3, lines 38-67). The emitted wavelengths from the chemical cloud are separated by a monochromator and sensed by detectors to be analyzed.

In Bernstein, the laser radiation causes an elevated vibrational temperature of the atoms of the target molecules that is above the <u>bulk gas</u> temperature of the cloud. The vibrational temperature identifies the amount of energy stored in the vibrational state of the atoms in the target molecules. The emissions from the decay of the excited vibrational states will cease when the vibrational temperature reaches the bulk gas temperature of the cloud. It is known that the energy in the vibrational states is rapidly relaxed to the bulk gas energy level through collisional quenching, which occurs in about 1ms to 100 ms. Because of this minimal time period, the Bernstein system uses a short excitation pulse and then a rapid sampling period to detect the emissions.

In contrast, Appellant's claimed system does not detect the emissions from the target molecules as a result of relaxation of the excited vibrational states of the atoms, but looks at the emission from the aerosol cloud or sample itself that occurs as a result of the cloud being at a higher temperature than its surrounding background. More particularly, the Bernstein system detects emissions from the target molecules in the cloud when the target molecules have a higher temperature than the remaining gas of the cloud, whereas Appellant's system detects emissions from the whole cloud. Because of this, Appellant's invention is not restricted to the short excitation pulses and rapid sampling times of Bernstein, but can employ long pulse or continuous wave (CW) type radiation sources and a much longer sampling time than that disclosed by Bernstein. In other words, because the Bernstein system only detects the emissions from the excited target atoms relative to the bulk gas temperature of the cloud, it must have a short excitation laser pulse and a rapid sampling period. On the other hand, Appellant's system senses the emissions from the cloud as a whole because it has a higher temperature than its surround background.

In the Bernstein system, the emissions from the cloud are from the excess energy stored in the vibrationally excited target molecules. These emissions will cease when the vibrational temperature of the molecules reaches the bulk gas temperature of the cloud. In contrast, the emissions generated by Appellant's system are the result of the temperature difference between the bulk gas in the cloud and the surrounding background. The emissions persist as long as the bulk gas temperature is higher than the background temperature, even though the vibrational temperature of the target molecules are no longer higher than the bulk gas temperature, as required by Bernstein. In other words, Appellant's

system does not rely on higher vibrational temperatures above the bulk gas temperature, but rather on a thermal contrast between the cloud and the surrounding background.

Appellant's invention is a modified passive system where the radiation source is only used to raise the temperature of the cloud against the background. The Bernstein system is not a passive system because the radiation source is used to raise the energy state of the molecules, where the emissions from the molecules are detected.

As discussed above, the Bernstein system relies on populating excess vibrationally excited states of the target molecules in a non-thermal equilibrium condition. To achieve such a vibrationally hot, non-thermal condition, Bernstein requires a laser to excite the vibrational states. The Bernstein system cannot use microwave or other types of radiation to achieve such a vibrationally hot, non-thermal condition. Appellant's invention, on the other hand, is based on heating of the aerosol cloud, not creating vibrationally hot molecules. Thus, Appellant's system can employ other types of radiation sources besides lasers, such as microwave and millimeter wave radiation sources, because the cloud itself is being heated. Therefore, because the Bernstein system does not heat the cloud itself relative to the background, Appellant submits that Bernstein cannot anticipate independent claims 1 and 21.

4. Taylor

Taylor discloses a remote hazardous air pollution monitoring system 35 that measures atmospheric absorption by hazardous pollutants in a gas 30 in the air. The system 35 includes a laser 22 that emits a pulsed laser beam through the gas 30 at a certain wavelength. The system 35 also includes detectors 62 and 64 that detect the intensity of two separate frequency bands returning from the scene. Appellant submits that

nowhere in Taylor does it teach that the laser beam heats the gas 30 relative to the surrounding background, and nowhere does Taylor teach a spectrum analysis device that generates an emissions spectrum of an aerosol in the gas 30. Therefore, Appellant submits that Taylor cannot anticipate dependent claims 1 and 21.

5. Childers

Childers teaches an open-path Fourier transform infrared (OP/FTIR) spectrometer used to measure the concentration of ammonia, methane and other atmospheric gases around an integrated industrial swine production facility in eastern North Carolina. Appellant respectfully submits that nowhere in Childers does it teach using a radiation source to raise the temperature of a sample cloud relative to its background, and a spectrum analysis device that receives emissions from the cloud and generates an emissions spectrum of aerosols in the cloud. Therefore, Appellant submits that Childers cannot anticipate independent claims 1 and 21.

6. Johnson

Johnson discloses a system 1 including a source 10 positioned a distance D from a receiver 20. The source 10 includes a surface 12 and a heating component 14. The receiver 20 receives emissions from a gas between the source 10 and the receiver 20 to generate an adsorption spectrum. Paragraphs 3 and 4 in Johnson, referenced by the Examiner, talk about the same type of active FTIR spectroscopy system that includes infrared radiation source. Applicant submits that nowhere in Johnson does it teach detecting an emissions spectrum of an aerosol, and nowhere in Johnson does it teach heating an aerosol cloud relative to its background to generate the emissions. Contrary,

Johnson teaches heating the surface 12. Therefore, Appellant submits that Johnson cannot anticipate independent claims 1 and 21.

C. Independent claims 1 and 21 are not obvious in view of Theriault

1. *Prima Facie* Obviousness

MPEP 2143 states that in order to establish a *prima facie* case of obviousness, three basic criteria must be met. First, there must be some suggestion or motivation, either in the references themselves, or in the knowledge generally available to one of ordinary skill in the art, to modify the reference or to combine reference teachings. Second, there must be a reasonable expectation of success. And, the prior art references must teach or suggest all of the claim limitations.

2. Theriault

Theriault discloses a system for measuring the temperature of a cloud using an FTIR detector of the type shown in figure 1 including an interferometer. Appellant submits that nowhere in Theriault does it teach or suggest raising the temperature of a sample cloud relative to a background using a radiation source, and nowhere in Theriault does it teach or suggest generating an emissions spectrum of aerosols in the cloud. Therefore, Appellant submits that Theriault does not make independent claims 1 and 21 obvious because Theriault does not teach or suggest all of the claim limitations.

D. Independent claims 8 and 24 are not obvious in view of Samuels and Bernstein or Bernstein and Samuels

As discussed above, Bernstein teaches remotely detecting chemical species by laser initiated non-resonant infrared spectroscopy. In that discussion, the evidence was set

forth that Bernstein does not teach or suggest heating the cloud itself relative to its background.

Samuels discloses a system for measuring bio-aerosols contained within a chamber, as shown in figure 1. An FTR provides a spectral image of the bio-aerosols, and a black body radiation source provides a background. The black body radiation source does not heat the aerosol or material within the chamber, but merely provides a heated background relative to the aerosol. Particularly, Samuels states that the chamber conditions are maintained at 24-30°C, the temperature of the aerosol, which is not heated. Appellant submits that Samuels does not teach or suggest a radiation source that heats a sample including an aerosol relative to its background from which an emissions spectrum is generated. Therefore, Appellant submits that because neither Bernstein nor Samuels teaches or suggests heating a sample containing an aerosol relative to the samples background, the combination of Samuels and Bernstein or Bernstein and Samuels cannot make independent claims 8 and 24 obvious.

E. Dependent claims 2, 3, 5-7, 22 and 23 are not anticipated by Bernstein, Taylor, Childers or Johnson

Concerning dependent claims 2, 3, 5-7, 22 and 23, Appellant submits that none of Bernstein, Taylor, Childers or Johnson teach the various spectrometers, radiation sources and telescopes identified in these claims in a system that includes a radiation source for raising the temperature of a sample cloud including an aerosol relative to the clouds background, and a spectrum analysis device that receives passive emissions from the cloud to generate an emissions spectrum of the aerosol. Therefore, Appellant submits that Bernstein, Taylor, Childers or Johnson cannot anticipate these dependent claims.

F. Dependent claims 2, 3, 5-7, 22 and 23 are not obvious in view of Theriault

Concerning dependent claims 2, 3, 5-7, 22 and 23, Appellant submits that Theriault does not teach the various spectrometers, radiation sources and telescopes identified in these claims in a system that includes a radiation source for raising the temperature of a sample cloud including an aerosol relative to the clouds background, and a spectrum analysis device that receives passive emissions from the cloud to generate an emissions spectrum of the aerosol. Therefore, Appellant submits that Theriault cannot make obvious these dependent claims.

G. Claims 9, 11, 12, 14, 25 and 26 are not obvious in view of Samuels and Bernstein or Bernstein and Samuels

Concerning dependent claims 9, 11, 12, 14, 25 and 26, Appellant submits that neither Bernstein nor Samuels teach the various spectrometers, radiation sources and telescopes identified in these claims in a system that includes a radiation source for raising the temperature of a sample including an aerosol relative to the samples background, and a spectrum analysis device that receives passive emissions from the sample to generate an emissions spectrum of the aerosol. Therefore, Appellant submits that the combination of Bernstein and Samuels cannot make obvious these dependent claims.

H. Claim 10 is not obvious in view of Samuels, Bernstein, Ho and Carlon or Bernstein, Samuels, Ho and Carlon

Ho discloses an aerosol generating system for maintaining a constant concentration of aerosol in a chamber that includes a nebulizer 12 that delivers the aerosol to the

chamber 10, and a fan 20 that distributes the aerosol within the chamber 10. Appellant submits that nowhere in Ho does it teach or suggest agitating a powder into an aerosol.

Carlon discloses using a fan 20 for evenly distributing an aerosol within a test chamber 10. However, Appellant submits that Carlon does not teach or suggest blowing a powder into an aerosol in a chamber.

VIII. Conclusion

Appellant respectfully submits that claims 1-3, 5-12, 14 and 21-26 are not indefinite under 35 USC §112, second paragraph; claims 1-3, 5-7 and 21-23 are not anticipated by Bernstein; claims 1-3, 5-7 and 21-23 are not anticipated by Taylor; Claims 1-3, 5-7 and 21-23 are not anticipated by Childers; Claims 1-3, 5 and 21-23 are not anticipated by Johnson; Claims 1-3, 5-7 and 21-23 are not obvious in view of Theriault; Claims 8, 9, 11, 12, 14 and 24-26 are not obvious in view of Samuels and Bernstein; and Claim 10 is not obvious in view of Samuels, Bernstein, Ho or Carlon. It is therefore respectfully requested that the Examiner's Final Rejections under 35 USC §112, §102 and §103 be reversed, and that Appellant's claims be allowed.

Respectfully submitted,

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CLAIMS APPENDIX

COPY OF CLAIMS INVOLVED IN THE APPEAL

1. A system for detecting and analyzing chemical and/or biological aerosols in a sample cloud in the air, said system comprising:

a radiation source, said radiation source directing a radiation beam towards the cloud, said radiation beam heating the cloud to raise the temperature of the cloud relative to its background; and

a spectrum analysis device responsive to emissions from the cloud, said spectrum analysis device generating an emission spectrum of the chemical and/or biological aerosols in the cloud from the emissions.

2. The system according to claim 1 wherein the spectrum analysis device is a spectrometer.

3. The system according to claim 2 wherein the spectrometer is selected from the group consisting of Fourier transform infrared spectrometers, grating tuned spectrometers, opto-acoustic spectrometers, circularly variable filter spectrometers, linear variable spectrometers and MEMS spectrometers.

4. The system according to claim 1 wherein the spectrum analysis device is a spectral imager.

5. The system according to claim 1 wherein the radiation source is selected from the group consisting of a microwave radiation source, a millimeter-wave radiation source, a CO_2 laser, an HF laser, a DF laser, a solid-state laser and a fiber laser.

6. The system according to claim 1 further comprising a beam expander telescope, said beam expander telescope receiving and expanding the radiation beam before it radiates the sample cloud.

7. The system according to claim 1 further comprising a receiving telescope, said receiving telescope being responsive to the emissions from the cloud and focusing the emissions on the spectrum analysis device.

8. A system for detecting and analyzing chemical or biological aerosols, said system comprising:

a chamber for holding the aerosol, said chamber including a first end and a second end, said first end having a first window;

a radiation source, said radiation source generating and directing a radiation beam through the first window to heat the aerosol within the chamber; and

a spectrum analysis device positioned relative to the first end of the chamber, said spectrum analysis device being responsive to emissions from the aerosol emitted through the first window, said spectrum analysis device generating an emission spectrum of the aerosol.

9. The system according to claim 8 wherein the first window is a high transmission window selected from the group consisting of polished salt windows, zinc selenide windows and other suitable windows having anti-reflective coatings.

10. The system according to claim 8 wherein the sample chamber includes at least one fan for agitating a powder into the aerosol.

11. The system according to claim 8 wherein the spectrum analysis device is a spectrometer.

12. The system according to claim 11 wherein the spectrometer is selected from the group consisting of Fourier transform infrared spectrometers, grating tuned spectrometers, opto-acoustic spectrometers, circularly variable filter spectrometers, linear variable spectrometers and MEMS spectrometers.

13. The system according to claim 8 wherein the spectrum analysis device is a spectral imager.

14. The system according to claim 8 wherein the radiation source is selected from the group consisting of a microwave radiation source, a millimeter-wave radiation source, a CO_2 laser, an HF laser, a DF laser, a solid-state laser and a fiber laser.

21. A system for detecting and analyzing chemical and/or biological aerosol in a sample cloud in the air, said system comprising:

a radiation source, said radiation source directing a radiation beam towards the cloud, said radiation beam having a frequency that is selected to be in resonance with target molecules, water vapor molecules or oxygen molecules in the cloud to cause the molecules to vibrate and increase the temperature of the cloud; and

a spectrometer responsive to emissions from the cloud, said spectrometer generating an emissions spectrum of the chemical and/or biological aerosol in the cloud from the emissions to identify the chemical and/or biological aerosol.

22. The system according to claim 21 wherein the spectrometer is selected from the group consisting of Fourier transform infrared spectrometers, grating tuned spectrometers, opto-acoustic spectrometers, circularly variable filter spectrometers, linear variable spectrometers and MEMS spectrometers.

23. The system according to claim 21 wherein the radiation source is selected from the group consisting of a microwave radiation source, a millimeter-wave radiation source, a CO_2 laser, an HF laser, a DF laser, a solid-state laser and a fiber laser.

24. A system for detecting and analyzing chemical and/or biological aerosols, said system comprising:

a chamber for holding the aerosol, said chamber including a first end and a second end, said first end having a window;

a radiation source, said radiation source generating and directing a radiation beam through the window, said radiation beam having a wavelength that is in resonance with target molecules, water vapor molecules or oxygen molecules so as to cause the molecules to vibrate and increase the temperature of the aerosol within the chamber; and

a spectrometer positioned relative to the first end of the chamber, said spectrometer being responsive to emissions from the aerosol emitted through the window, said spectrometer generating an emissions spectrum of the aerosols.

25. The system according to claim 24 wherein the spectrometer is selected from the group consisting of Fourier transform infrared spectrometers, grating tuned spectrometers, opto-acoustic spectrometers, circularly variable filter spectrometers, linear variable spectrometers and MEMS spectrometers.

26. The system according to claim 24 wherein the radiation source is selected from the group consisting of a microwave radiation source, a millimeter-wave radiation source, a CO_2 laser, an HF laser, a DF laser, a solid-state laser and a fiber laser.

EVIDENCE APPENDIX

There is no evidence pursuant to §1.130, §1.131 or §1.132.

RELATED PROCEEDINGS APPENDIX

There are no decisions rendered by a court or the Board in any proceeding identified in Section II of this Appeal Brief.